

Supporting behaviour change for diabetes prevention

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Introduction

Changing an existing habit requires people to establish a motivation or intention to change, make decisions and action plans, recognise and overcome barriers (both practical and psychological), initiate the new routine, and then to maintain the new routine, resisting temptations to relapse back to former habits. There is great potential for individual variation in motivations, as well as numerous social, environmental, and psychological factors which might facilitate or hinder efforts to make change. Approaches for supporting changes in diet and physical activity, as used in practice, vary from simple information-giving to more intensive programmes, which may or may not be based on theoretical models of behaviour change.(1-4)

Because of the complexity and individual variation in factors influencing change, approaches based on didactic education of patients (*telling them* what to change and how and why it is important), including most information-giving approaches are unlikely to be effective in initiating and maintaining change.(5, 6) It is well known from both research and clinical practice that patients do not respond well to simple instructions about the need to lose weight, stop smoking or get more physically active. Patients who “don’t do what they are told” are a major source of frustration to health care practitioners. Even when patients do make changes, they often revert back to their original behaviours (e.g. regaining lost weight, allowing gym memberships to lapse).

So what *does* work for promoting weight loss and increased physical activity (the two main goals of diabetes prevention)? What kind of support or intervention is more likely to deliver behaviour change? How can we tackle this complex problem in ways which make efficient use of available resources? How can we ensure that changes which are achieved are sustained? This chapter will attempt to answer these questions within the context of diabetes prevention programmes. The overall aim is to provide an understanding of how behaviour change works, and of how to design behaviour change programs to maximise their effectiveness.

Understanding behaviour change: Insights from theory, practice and evidence

Theory: The science of health psychology (also known as ‘behavioural medicine’), emerging in the late 1970s, is relatively young but rapidly growing into a strong influence in chronic disease prevention. A number of theories have been developed and applied to health behaviour change including social cognitive theory,(3) self-regulation theory,(4,7) control theory,(8) theory of planned behaviour,(1) and ecological systems theory.(9, 10) Research on these theories has identified a number of factors that influence health behaviour (Table 1).

The wide range of possible influences on behaviour includes a mixture of cognitive or rational processes (cognitive influences), and “non-rational” or non-conscious processes (social and emotional influences), as well as environmental cues. The factors which support unhealthy lifestyle and which can be modified to support behaviour change will also vary from person to person. For instance, some people might be concerned about the safety of

going out jogging in their local park, while others might be having relationship stresses which take priority over looking after their own health. In order to effect change, we need to address (or teach the person to address) each relevant influence and it can be quite time-consuming to do this properly.

The processes of behaviour change identified by theories can be useful in improving our understanding of the challenges we are facing, as well as in informing our choice of intervention methods. Theories also help to suggest specific techniques for intervention (e.g. gradually increasing targets to build confidence, involving family and friends to help increase social support). There is no single theory or leading health behaviour model which has been shown to provide a reliable basis on which to build successful interventions for changing health behaviour.(11, 12) A recent systematic review of interventions for changing diet and physical activity found no difference in effectiveness between interventions with or without a stated theoretical basis.(13) This may reflect poor implementation of theories (11), or poor initial specification of the theoretical basis of the intervention. Without a theoretical base or documented understanding of why a particular intervention works, the behaviour change process becomes ad hoc or particular to that individual or group and we cannot replicate or identify ways to improve such interventions.

Clinical practice: Another way in which insights have arisen about how behaviour change might be encouraged is from the direct experience of what seems to work or not work in clinical practice. Clinical psychologists in particular have generated, from experience (and perhaps with some additional insights from theory), intervention models such as cognitive behavioural therapy, motivational interviewing, and consultation approaches based on empowerment and shared decision-making.(14, 15) These models tend to emphasise the use of a person-centred style of engagement (i.e., the opposite of the didactic educational approach). They suggest a concordance-based approach, which requires both parties to respect and acknowledge the other's expertise and remit, and to work together to manage the condition.(16) Patients are acknowledged as experts on what is feasible in the context of their own lives and as having control over treatment implementation. There is good evidence that partnership in health care settings is desirable and acceptable for most patients.(17-19)

Table 1: Influences on behaviour derived from health behaviour theories

Cognitive influences	Social influences	Emotional influences	Environment
<ul style="list-style-type: none"> • Personal goals and other priorities • Coping skills and strategies • Understanding of illness and risk • Perceived benefits and costs of relevant health behaviours • Perceived control over health outcomes • Confidence and self-efficacy (can I do it?) • Perceived treatment efficacy (will it work?) • Past experience and behaviour (habits) 	<ul style="list-style-type: none"> • Peer pressure • Social support • Cultural influences • Social context (e.g. work vs. home) • Opportunities for social contact • Social comparisons • Social norms • Relationships • Prioritising the needs of others over one's self 	<ul style="list-style-type: none"> • Stress /other life priorities • Body image • Personal impact of symptoms • Perceived risk • Acute or chronic mood states (anxiety, depression) • Denial or minimisation of illness and risk • Discomfort • Positive emotions (enjoyment, pleasure, happiness) 	<ul style="list-style-type: none"> • Environmental cues • Ease of access to healthy options /activities • Perceived comfort and safety

Evidence: Although theory and clinical practice are excellent sources of ideas about how to change behaviour, the only way to systematically understand what works in practice is to rigorously evaluate interventions based on these ideas. So what does the evidence base tell us?

As part of the development of the IMAGE guideline in Europe (www.image-project.eu), a systematic review of existing high quality evidence on interventions to promote changes in diet and physical activity was conducted.(20) This review aimed specifically to identify evidence about what intervention components were associated with increased effectiveness. The evidence was filtered for quality and the strength of the evidence graded using established rating systems.(21, 22) The evidence showed that interventions to promote lifestyle changes are more likely to be effective if they

- a) Target both diet and physical activity,
- b) Mobilise social support,
- c) Involve the planned use of established behaviour change techniques,
- d) Provide a higher frequency or number of contacts,

- e) Include self-regulatory techniques, and
- f) Pay specific attention to supporting behaviour maintenance.

Specific techniques to support behaviour change and maintenance were associated with increased effectiveness. These included: motivational interviewing, the use of a specific set of “self-regulatory” techniques (self-monitoring including use of pedometers, specific goal setting; providing feedback on progress; relapse prevention techniques, review of goals), and prompting self-talk. Further techniques were associated with increased effects on physical activity (prompting practice, individual tailoring, time management). The authors suggested that “building on a coherent set of ‘self-regulatory’ intervention techniques (as above) may provide a good starting point for intervention design”.

The need for interventions to attend closely to how they can support long-term maintenance of behaviour was also identified as a specific problem. Although there is no clear evidence on what specific techniques enhance maintenance, suggestions made by the authors were: establishing self-monitoring of progress (e.g. using pedometers and /or regular self-weighing), engaging social support, providing follow-up prompts (e.g. by email, telephone) and organising additional intervention sessions to provide feedback (e.g. on changes achieved in blood glucose and other risk factors), reviewing goals, and using relapse prevention /relapse management techniques(23) (this essentially involves identifying barriers to making the desired change (see Table 1) and identifying strategies to overcome them).

Examples of well-developed interventions

Almost all of the above recommendations on supporting behaviour change are implemented in the US and Finnish diabetes prevention programmes,(24-26) and these were very successful in achieving sustained behaviour change (at least ten years for the US DPP and seven years for the Finnish DPS). Both the US Diabetes Prevention Program (DPP)(24, 25) and the Finnish Diabetes Prevention Study (DPS)(26) focused on lifestyle change using dietary, physical activity, and behavioural interventions with adults at high risk of developing type 2 diabetes.

The US DPP intensive lifestyle intervention was largely an individual program, with some follow-up group sessions, facilitated by a case manager, usually a dietician. The intervention aimed to achieve the program goals of 7% weight loss, a low calorie, low fat diet, and moderate-intensity exercise for 150 minutes per week. The lifestyle program comprised 16 lessons covering diet, exercise, and behaviour modification over 24 weeks, monthly follow-up, twice-weekly supervised exercise sessions, and supplementary group classes. Behavioural techniques included exploring and enhancing motivations, engaging social support, individual goal setting and problem-solving (relapse prevention and relapse management) with the assistance or support of a lifestyle coach, as well as self-monitoring and considerable review of goals and feedback in a series of maintenance sessions. The programme is fully described at <http://www.bsc.gwu.edu/dpp/index.htmlvdoc> . Participants in the lifestyle intervention group achieved a 58% relative risk reduction in diabetes incidence over the course of the study (mean 2.8 years).

The Finnish DPS lifestyle intervention also targeted both diet and exercise and used a range of established behaviour change techniques, including self-regulatory techniques and a high frequency of contact. The intervention comprised seven sessions of individual face-to-face

consultation with a dietician during the first year and follow-up every three months, individual counselling for physical activity and supervised moderate intensity resistance training sessions. Behavioural interventions focused on individuals learning to self-monitor their diet, weight, and physical activity, using feedback from nutritionists to set practical dietary goals, and counselling to assist with specific problems to achieve gradual behaviour changes. The intervention produced a 58% relative risk reduction in the progression to type 2 diabetes over a mean of 3.2 years.

The US DPP and Finnish DPS have demonstrated that lifestyle modification is effective in reducing diabetes risk, and that achieving specific dietary and physical activity goals is key to diabetes prevention. The dietary and physical activity targets are clearly specified in both programs, and there is reasonable documentation of the intensity and duration of the interventions in published reports. Many of the strategies were based on learning principles, motivation theory, and related behavioural change theories(27). Both the US DPP and the Finnish DPS included behaviour change techniques such as self-monitoring of activity, goal setting and review of goals, problem solving, providing feedback, social support, and individually tailored sessions.

Two group-based diabetes prevention programs that have been developed from the principles of the Finnish DPS are the Good Ageing in Lahti Region (GOAL) community health promotion program in Finland,(28) and the Greater Green Triangle Diabetes Prevention Program (GGT DPP) conducted in primary healthcare practices in Australia.(29) The content and design of the GOAL program and the GGT DPP have the same key lifestyle change objectives of the Finnish DPS with respect to nutrition, physical activity and weight loss. The lifestyle intervention takes the form of six structured group sessions, each of about 2 hours, conducted over an 8-month period, and facilitated by a specially-trained public health nurse (in Finland) or a study nurse (in Australia). A project dietician and physiotherapist or exercise physiologist can support these facilitators.

The program components are closely aligned to self-regulation theory and the Health Action Process Approach,(30) a social-cognitive health behaviour model. They include provision of information, self-monitoring, individual goal setting, graduated behaviour change, creating short-term plans, addressing barriers and lapses, planning for longer-term maintenance, and using feedback. The group format allows for ideas and support from others who are also at high risk of type 2 diabetes and makes optimal use of scarce facilitator time. The facilitator encourages individual goal setting and planning and group discussion, and provides feedback on homework activities. The dietician and physiotherapist each attend one session and provide guideline information about nutrition and physical activity, as well as assisting with goal setting and planning.

The GOAL program and GGT DPP have shown that group-based lifestyle change programs are feasible and effective methods for implementation of diabetes prevention in community and health care settings. Both interventions are described in detail in other chapters.

A template for design of interventions

Some of the above information is quite complex and technical, so how can we best pull it all together to help design or select effective interventions for diabetes prevention? The intervention model below was designed to be consistent with the recommendations for supporting changes in diet and physical activity outlined here. A number of theoretical

models of behaviour change were considered during the design of the model, all with self-regulatory stages (as recommended in the guidance). These included Leventhal's Self-Regulation Theory, Control Theory, and Social Cognitive Theory. The model presented (Fig. 1) is consistent with all these theoretical perspectives, but, although somewhat adapted (e.g. specific inclusion of social support), most closely resembles the Health Action Process Model (HAPA, 30). The HAPA outlines distinct motivational, action and maintenance phases in behaviour change and explains the “mechanisms that operate whenever individuals become motivated to change habits, adopt and maintain new behaviours, and attempt to resist temptations and recover from setbacks”(31, p.145).

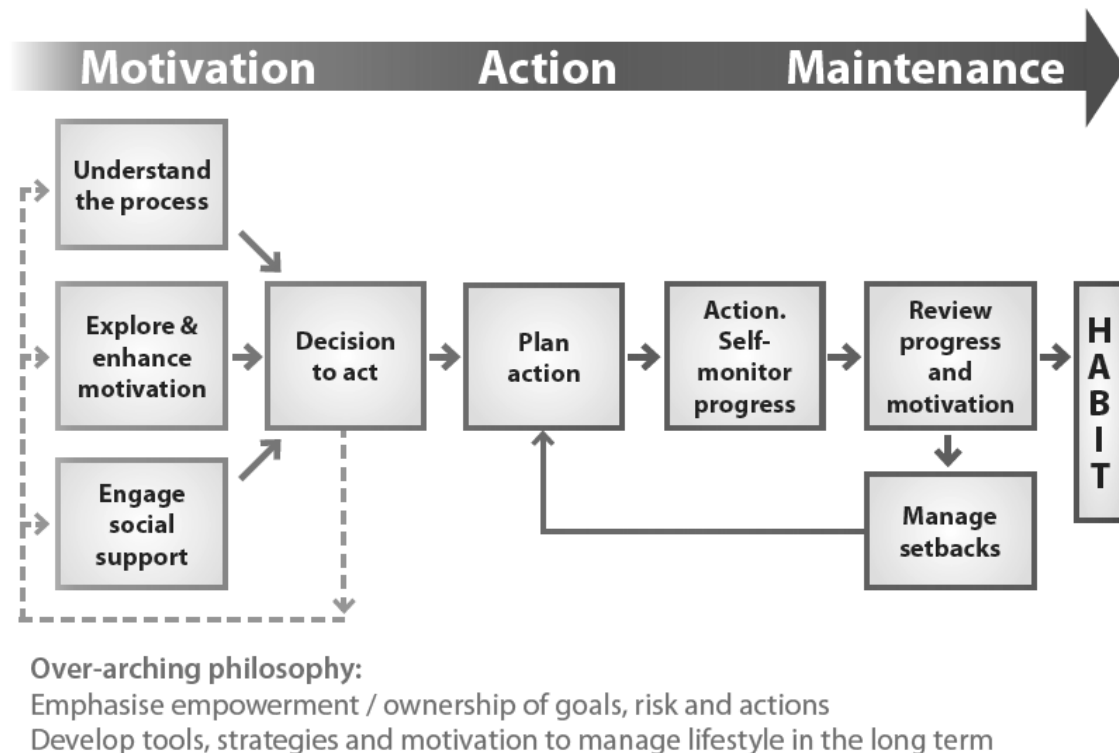


Fig. 1: A process model for supporting lifestyle behaviour change

Processes of behaviour change and selection of techniques

The processes shown in the model above (and the headings below) represent *what intervention participants need to do to achieve the desired behavioural outcomes* (e.g. getting motivated, making a specific action plan). A consideration of what modifiable factors might influence the achievement of each process provides a basis for the selection of intervention techniques that would be suitable for delivery in practice. The results of our attempts to do this (our ‘intervention mapping’ exercise) are outlined below. The choice of techniques may vary of course, depending on the resources available, the need to account for specific cultural or socio-economic or health-status factors, or the organisational context in which the intervention programme is to be delivered (e.g. the workplace as opposed to primary care).

Understanding the process of behaviour change

Each individual should be able to understand the basic process of behaviour change, including likely challenges and what kind of support might help them to achieve success.

Intervention strategies will aim to target modifiable determinants of developing this understanding, such as prior knowledge and experience of behaviour change.

Possible Behaviour Change Techniques (BCTs)¹:

- Building experience by trial and error (e.g. a small experiment to change one simple behaviour over the next week) with subsequent discussion.
- Empowering information-exchange techniques, such as the elicit-provide-elicited (e-p-e) technique⁽²⁾ and reflective listening.⁽²⁾
- Presenting information in the form of metaphors or stories.

Explore and enhance motivation for change

1) Importance: Participants should be able to recognise the importance of changing their dietary and /or physical activity behaviour and understand why it is important. Intervention strategies should aim to target modifiable determinants of perceived importance, such as awareness of risk (how high is my risk of type 2 diabetes /other health consequences), and outcome expectancies (what effect will changing my behaviour have? What are the pros and cons of making a change?).

Possible BCTs:

Motivational interviewing (MI) techniques⁽²⁾ (e.g., explore pros and cons of change, enhance perceived importance, affirm and reinforce change talk)

2) Self-efficacy (confidence): Participants should develop the confidence to be able to carry out changes in their behaviour. Intervention strategies should aim to target modifiable determinants such as interpretations of past experiences of behaviour change, perceived barriers, perceived difficulty of the desired behaviour and existing levels of self-efficacy.⁽³³⁾

Possible BCTs:

- Motivational interviewing techniques⁽²⁾ (e.g. evocative questioning to elicit barriers and strengths).
- Set graded tasks.
- Identify likely barriers and solutions (relapse prevention techniques).^(34, 35)
- Reinforce personal strengths and resources.
- Visualisation (imagine what life might be like if the change is made).

Identify and engage sources of social support

Each individual should be able to recognise the value of engaging social support in the behaviour change process and be able to identify the type of social support that would be useful to them. Intervention strategies should aim to target modifiable determinants such as the quantity and quality of social support relationships and social skills.

Possible BCTs:

- Plan social support and social change.
- Provide general information about the different types of social support (instrumental, emotional, informational).⁽³⁶⁾
- General communication skills training.⁽³⁷⁾
- Social skills training.

¹ NB: Many of the behaviour change techniques (BCTs) referred to here are defined in more detail in a recent taxonomy of behaviour change (32) and so definitions are not repeated here. We have also provided further references where relevant /where the techniques are relatively complex.

Intention formation

Each individual should be able to summarise the advantages and disadvantages of engaging in different behaviours, and be able to use this information to form decisions about whether or not to make changes. Intervention strategies should aim to facilitate this process by helping participants to summarise motivations and barriers and possible sources of support, and to come to a decision about what aspects of behaviour they might wish to change.

Possible BCTs:

- Goal setting focused on target behaviours and outcomes (e.g. weight).(37)
- Elicit a summary of motivations and reasons for confidence /main barriers.
- Decisional balance.(2)

Action planning

1) Create an action plan

Each person should be able to use the knowledge they have acquired so far to formulate an action plan for changing behaviour(s). Action plans should contain specific goals, identified sources of social support and coping strategies.(38) Goals and plans should be determined by the participant rather than the intervention provider.

Possible BCTs:

- Make an action plan.
- Set graded tasks (e.g. short term and longer term goals).
- Prompt self-monitoring (of behaviour and outcomes).(8,37)

2) Relapse prevention (34,35)

Each individual should be able to identify potential barriers to successful behaviour change, to identify possible coping strategies to overcome these barriers and to include these strategies in their action plan. Target modifiable determinants such as problem-solving skills and awareness of barriers to change. Consider different types of barrier in turn: e.g. financial, environmental, social, and emotional barriers.

Possible BCTs:

- Coping planning (prompting identification of barriers and solutions).(34, 35)
- Social support planning (as part of the coping plan).
- Teach to use prompts and cues.
- Prompt self-monitoring of behaviour.
- Prompt use of imagery.

Initiate Action:

Each individual should be able to successfully implement a personal behaviour change plan. This is something that happens outside of the intervention context, but preceding (and following) intervention strategies should have already targeted modifiable determinants such as: building self-efficacy, engaging social support, ability to identify and overcome different barriers to change.

Progress review

Each individual should be able to re-appraise their progress, motivation and social support and reinforce their motivations periodically. Target modifiable determinants such as perceived importance, self-efficacy, outcome expectations, social support and contingent rewards

Possible BCTs:

- Prompt self-monitoring of behaviour (and outcomes).
- Provide feedback on performance.
- Provide opportunities for social comparison (how they are doing compared with others: e.g. explaining that it is normal to have setbacks and or to make several attempts in order to succeed).

Relapse management

Individuals should learn from their experiences with behaviour change how to build on success and how to manage setbacks or new challenges. This can be achieved through using feedback from their ongoing experience of making behavioural changes to revise their action plans and strategies for change. Target key determinants such as knowledge of the behaviour change process, emotional reaction to success/failure and ability to problem solve (to identify and address barriers to change).

Possible BCTs:

- Relapse management techniques (34,35)
- Provide rewards (e.g. self-reward ideas) contingent on effort or progress towards behaviour.
- Provide information (e-p-e).
- Prompt review of goals and action plan.

Following relapse management work and the progress review, participants should then be encouraged to review their goals and action plans and include new ideas about how to overcome potential barriers.

Conclusion

This chapter provides practical advice for the design of diabetes prevention programmes, which is grounded in theory and the evidence base. Programme developers need to take into consideration the evidence on which techniques and processes are associated with increased effectiveness. Certainly, the three main processes involved in behaviour change; Motivation, Action and Maintenance should all be carefully addressed. Knowledge of theoretical models and insights from clinical experience can help to inform the choice of intervention components. To optimise the impact of interventions in practice, providers should also consider the organisational, societal, and environmental level influences on successful recruitment and delivery. Supporting behaviour change is a complex process. However, designing interventions using the information provided in this chapter may increase the chance of achieving the sustained changes in diet and physical activity that are needed for diabetes prevention.

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